Amend Section 2203B.1 and 2203B.2 to the following:

SECTION 2203B - STRUCTURAL STEEL CONSTRUCTION

2203B.1 The design, fabrication and erection of structural steel shall be in accordance with the requirements of Division VIII (LRFD) or Division IX (ASD).

2203B.2 Seismic design of structures shall comply with *Section 2211B or Division XI*.

Section 2211B.4.1 is amended to read as follows:

2211B4.1 Quality. Structural steel used in lateral-force-resisting systems shall conform to A 36, A 500, A 501, *A992,* A 572 (Grades 42 and 50) and A 588. Structural steel conforming to A 283 (Grade D) may be used for base plates and anchor bolts. **...**

All welds used in primary members and connections in the lateral force resisting system shall be made with a filler metal that has a minimum Charpy V-notch toughness of 20 ft-lbs at minus 20 degrees F, as determined by AWS Classification or manufacturer certification.

Section 2211B.7.1.2 is amended to read as follows:

2211B.7.1.2 Connection Strength. *Connection configurations utilizing welds or high-strength bolts shall demonstrate, by approved cyclic test results or calculations, the ability to sustain inelastic rotation and develop the strength criteria in Section 2211B.7.1.1 considering the effects of steel overstrength and strain hardening.*

Design of beam-to-column joints shall be substantiated by testing to have an inelastic rotation of at least 0.03 radians.

Section 2211B.10.12 is amended to read as follows:

2211B.10.12 Link beam-column connections. ...

3. The link-to-column connection design shall be substantiated by cyclic test results that equals or exceeds the rotation angle as prescribed in Section 2211B.10.12.2 .

Section 2212B.3 is amended to read as follows:

2212B.3 Tests of End-welded Studs. *End-welded studs shall be sampled, tested and inspected per the requirements of the Structural Welding Code-Steel1998 edition, published by the American Welding Society.*

Section 2212B.4 is amended to read as follows:

2212B.4 *Inspection of Shop Fabrication. ...*

When welds from web doubler plates or continuity plates occur in the k-area of rolled steel columns, the k-area adjacent to the welds shall be inspected after fabrication as required by the enforcement agency, using approved nondestructuve methods conforming to AWS D1.1. The k-area is defined in wide flange shapes to be the area of the web immediately adjacent to the flange, extending from the fillet to a point approximately 1-1/2 inches beyond the point of tangency between the fillet and the web.

Section 2212B.5 is amended to read as follows:

2212B.5 Inspection of Welding. *Inspection of all shop and field welding operations, including the installation of automatic end-welded stud shear connectors shall be made by a qualified welding inspector approved by the enforcement agency. Such inspector shall be a person trained and thoroughly experienced in inspecting welding operations. The inspector's ability to distinguish between sound and unsound welding shall be reliably established. The minimum requirements for a qualified welding inspector shall be as those for an AWS certified welding inspector (CWI), as defined in the provisions of the ANSI/AWS QC-1-96, Standard for AWS Certification of Welding Inspectors published by the American Welding Society. All welding inspectors shall be as approved by the enforcement agency.*

The ability of each welder to produce sound welds of all types required by the work shall be established by welder qualification satisfactory to the enforcement agency.

Welding inspection of structural welding shall conform to the requirements of AWS D1.1 Structural Welding Code-Steel, 1998 edition, published by the American Welding Society, except as modified by this section.

Welding inspection of cold-formed steel members shall conform to the requirements of AWS D1.3.

The welding inspector shall make a systematic record of all welds. This record shall include in addition to other required records:

1. Identification marks of welders.
2. List of defective welds.
3. Manner of correction of defects.

The welding inspector shall check the material, equipment, details of construction and procedure, as well as the welds. The inspector shall also check the ability of the welder. The inspector shall verify that the installation procedure for automatic end-welded stud shear connectors is in accordance with the requirements of AWS D1.1, Structural Welding Code-Steel, 1998 edition, published by the American Welding Society and the approved plans and specifications. The inspector shall furnish the architect, structural engineer and the enforcement agency with a verified report that the welding is proper and has been done in conformity with AWS D1.1, Structural Welding Code-Steel, 1998 edition, published by the American Welding Society, and the approved plans and specifications. The inspector shall use all means necessary to determine the quality of the weld. The inspector may use gamma ray, magnaflux, trepanning, sonics or any other aid to visual inspection which the inspector may deem necessary to be assured of the adequacy of the welding.

EXCEPTION: *Plant welding inspection of open-web steel joists may be waived with the approval of the enforcement agency where welding inspection is provided at the jobsite.*

Section 2212B.8 is added as follows.

2212B.8 Tests of Beam to Column Moment Connections. *When testing is required in these provisions for beam-to-column moment connections in moment frames and link-to-column connections in eccentric braced frames, it shall meet the requirements of Appendix S Qualifying Cyclic Tests of Beam and Link-To-Column Connections as part of the Seismic Provisions for Structural Steel Buildings, April 15, 1997 published by the American Institute of Steel Construction, 1 East Wacker Drive, Suite 3100, Chicago, IL 60601, including Supplement No. 1 dated February 15, 1999, with the amendments of Section 2214B.*

Add a new Division to Chapter 22 Steel as follows:

Division XI - SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS

Based on Seismic Provisions for Structural Steel Buildings of the American Institute of Steel Construction, Part I.

(April 15, 1997)

SECTION 2213B - ADOPTION

Except for the modifications as set forth in Section 2214B of this Division and the requirements of the building code, the seismic design, fabrication, and erection of structural steel shall be in accordance with the Seismic Provisions for Structural Steel Buildings, April 15, 1997 published by the American Institute of Steel Construction, 1 East Wacker Drive, Suite 3100, Chicago, IL 60601, including Supplement No. 1 dated February 15, 1999.

SECTION 2214B - AMENDMENTS

The Seismic Provisions for Structural Steel Buildings, hereinafter referred to as AISC Seismic 97, shall include only Part I (LRFD) and Appendix S. Where other codes, standards, or specifications are referred to in AISC Seismic 97 they are considered as supplemental standards and only considered guidelines subject to the approval of the enforcement agency.

1. Part I, Section 4.1. Revise to the following:

Q_E is the horizontal component of the earthquake load *1.5*E *where E is the earthquake load from Chapter 16B Division III* . Where required in these Provisions, an amplified horizontal earthquake load $Ù_o Q_E$ shall be used in lieu of Q_E as given in the load combinations below. The term $Ù_o$ is the System Overstrength Factor as defined in the Applicable Building Code. In the absence of such definition, $Ù_o$ shall be as listed in Table I- 4-1.

2. Part I, Section 4.1. Add the following at the end of the Section.

Load combinations from LRFD Specification Section A4.1 shall be revised where E is the earthquake load from Chapter 16B Division III as follows:

1.2D " 1.5E + 0.5L +0.2S *(A4-5)*

0.9D " (1.3W or 1.5E) *(A4-6)*

3. Part I, Glossary. Add the following:

Rapid Strength Deterioration: *A mode of behavior characterized by a sudden loss of strength. In a cyclic test with constant or increasing deformation amplitude, a loss of strength of more than 50 percent of the strength attained in the previous excursion in the same loading direction.*

4. Part I, Glossary. Ordinary, Intermediate, and Special Truss Moment Frame (OMF, IMF and STMF). Delete.

5. Part I, Section 9.2 amend to read as the following:

9.2. Beam-to-Column Joints and Connections

9.2a. The design of all beam-to-column joints and connections used in the Seismic Force Resisting System shall be based upon qualifying cyclic test results in accordance with Appendix S that demonstrate an inelastic rotation of at least 0.03 radians. Qualifying test results shall consist of at least *three* cyclic tests and shall be based upon one of the following requirements:

a. Tests reported in research or documented tests performed for other projects that are demonstrated to reasonably match project conditions.

b. Tests that are conducted specifically for the project and are representative of project member sizes, material strengths, connection configurations, and matching connection processes.

6. Part I, Section 10. Intermediate Moment Frames (IMF) including Commentary Section C10. Delete.

7. Part I, Section 11. Ordinary Moment Frames (OMF) including Commentary Section C11. Delete.

8. Part I, Section 12. Special Truss Moment Frames (STMF) including Commentary Section C12. Delete.

9. Part I, Section 15.4b. Add the following to the end of the paragraph:

15.4b. Where reinforcement at the beam-to-column connection at the Link end precludes yielding of the beam over the reinforced length, the Link is permitted to be the beam segment from the end of the reinforcement to the brace connection. Where such Links are used and the Link length does not exceed $1.6\ M_p/V_p$, cyclic testing of the reinforced connection is not required if the design strength of the reinforced section and the connection equals or exceeds the required strength calculated based upon the strain-hardened Link as described in Section 15.6a. Full depth stiffeners as required in Section 15.3a. shall be placed at the Link-to-reinforcement interface. *Cyclic testing of the Link connection to the weak axis of a wide flange column is required for any length link.*

10. Part I, Section S2. Add the following:

S2. SYMBOLS

è *Peak deformation (interstory drift angle) in radians used to control loading of the test specimen.*

11. Part I, Section S3. Revise to read as follows:

S3. DEFINITIONS

Inelastic Rotation. The permanent or plastic portion of the rotation angle between a beam and the column or between a Link and the column of the Test Specimen, measured in radians.

The Inelastic Rotation shall be computed based upon an analysis of Test Specimen deformations. Sources of Inelastic Rotation include yielding of members and connectors, yielding of connection elements, and slip between members and connection elements. *The rotation is represented by the plastic chord rotation angle calculated as the plastic deflection of the beam or girder, at the center of its span divided by the distance between the center of the beam span and the centerline of the panel zone of the beam column connection .*

12. Part I, Section S5.2. Revise to read as follows:

S5.2. Size of Members

1. The size of the beam or Link used in the Test Specimen shall be within the following limits:

a. *At least one of the test beams or Links shall be 100% of the depth of the prototype beam or Link. For the remaining specimens ,* the depth of the test beam or Link shall be no less than 90 percent of the depth of the Prototype beam or Link.

b. *At least one of the test beams or Links shall be 100% of the weight per foot of the prototype beam or Link. For the remaining specimens , ~~the~~* weight per foot of the test beam or Link shall be no less than 75 percent of the weight per foot of the Prototype beam or Link.

...

13. Part I, Section S6.3. Revise to the following:

S6.3 Loading Sequence

Loads shall be applied to the Test Specimen, up to the completion of the test, to produce the following deformations:

1. 6 cycles of loading at è = 0.00375

2. 6 cycles of loading at è = 0.005

3. 6 cycles of loading at è = 0.0075

4. 4 cycles of loading at è = 0.01

5. 2 cycles of loading at è = 0.015

6. 2 cycles of loading at è = 0.02

7. 2 cycles of loading at è = 0.03

8. After completion of loading cycles at 0.03 , testing shall be continued to applying cyclic loads to produce è equal to 0.04, 0.05, etc., with two complete loading cycles at each increment.

Or alternatively, the loading sequence may be the following:

1. 3 cycles of loading at $0.25\mathbf{d}_y \_ \mathbf{d} \_ 0.5\mathbf{d}_y$

2. 3 cycles of loading at $0.6\mathbf{d}_y \_ \mathbf{d} \_ 0.8\mathbf{d}_y$

3. 3 cycles of loading at $\mathbf{d} = \mathbf{d}_y$

4. 3 cycles of loading at $\mathbf{d} = 2\mathbf{d}_y$

5. 3 cycles of loading at $\mathbf{d} = 3\mathbf{d}_y$

6. 2 cycles of loading at $\mathbf{d} = 4\mathbf{d}_y$

7. After completion of the loading cycles at $4\mathbf{d}_y$, testing shall be continued by applying cyclic loads to produce $\mathbf{d}$ equal to $5\mathbf{d}_y$, $6\mathbf{d}_y$, $7\mathbf{d}_y$, etc. Two cycles of loading shall be applied at each incremental value of deformation.

Other loading sequences are permitted to be used to qualify the Test Specimen when they are demonstrated to be of equivalent severity.

14. Part I - Section S10. Revise as follows:

S10. ACCEPTANCE CRITERIA

For each connection used in the actual frame, at least *three* cyclic tests are required for each condition in which the Essential Variables, as listed in Section S5, remain within the required limits. All tests shall satisfy the criteria stipulated in Sections 9.2, or 15.4, as applicable. In order to satisfy Inelastic Rotation requirements, each Test Specimen shall sustain the required rotation for at least *two complete loading cycles without exhibiting rapid strength deterioration.*